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L2: Entry 1 of 1

File: PGPB

Sep 19, 2002

DOCUMENT-IDENTIFIER: US 20020132261 A1

TITLE: Multi-featured arrays with reflective coating

Series Code and Application Number:10/080641Summary of Invention Paragraph:

[0015] The present invention further provides an addressable array of the types described above. The spacer layer may particularly be of a thickness such that the distance from the reflecting layer to the actual light emitting moiety of the features (such as the fluorescent labels mentioned above) is about 1/4 the wavelength of the interrogating or emitted light (the wavelength being measured in the spacer layer). This construction can result in the features being at about the previously mentioned anti-node when the interrogating light is directed to the array perpendicular to the array surface. Since "light" includes infra-red to ultraviolet over a range of about 200 to 300 nm, and given that the moieties themselves will be relatively short, a typical spacer thickness may for example be between 50 nm to 750 nm thick, and more preferably between 50 nm to 150 nm thick, or some integral multiple within the foregoing ranges. There is also provided a kit of the present invention which may include such an array and instructions (whether machine or human readable) on a suitable medium (for example, disk or paper) that it is to be used with an interrogating light of indicated wavelength. An apparatus for interrogating an addressable array of multiple features of different moieties is also further provided. Such an apparatus includes a light source to provide the interrogating light, and a detector system to detect light signals emitted by respective features in response to the interrogating light, at multiple different detection angles. Note that multiple different angles of interrogating light (when used) and/or detection can be obtained by altering the angle of the interrogating light or the detector with respect to the array (for example, either the interrogating light or detector can be moved), or both. Alternatively, multiple interrogating light sources or multiple detectors can be provided, such that the different interrogating light and/or detection angles are obtained. The apparatus may also include a reader (which implies a suitable machine) to read a code carried by an array package, and a processor which causes the detector system to detect emitted light at a detection angle based on the read code.

Detail Description Paragraph:

[0051] The apparatus of FIG. 5 may further include a reader 170 which reads identification 54. When identification 54 is in the form of a bar code, reader 170 may be a suitable bar code reader. A system controller 180 of the apparatus is connected to receive signals emitted in response to the interrogating light from emitted signal detector 130, as well as signals indicating a read identification from reader 170, and controls the transporter to adjust the detection angle of detector 150 based on the read identification (and may also control focuser/scanner 160 based on such read identification). Controller 180 may also analyze, store, and/or output data relating to emitted signals received from detector 130 in a known manner. Controller 180 may include a computer in the form of a programmable digital processor, and include a media reader 182 which can read a portable

removable media (such as a magnetic or optical disk), and a communication module 184 which can communicate over a communication channel (such as a network, for example the internet or a telephone network) with a remote site (such as a database at which information relating to array package 30 may be stored in association with the identification 54). Controller 180 is suitably programmed to execute all of the steps required by it during operation of the apparatus, as discussed further below. Alternatively, controller 180 may be any hardware or hardware/software combination which can execute those steps.

CLAIMS:

32. An apparatus for interrogating an addressable array of multiple features of different moieties, comprising: (a) a detector system which has one or more optical axes so as to detect different emitted light wavelengths at respective different detection angles with an optical axis aligned at each detection angle; and (b) a processor which receives signals from the detector system and correlates the received signals with respective array features.

36. An apparatus according to claim 32 additionally comprising a reader to read a code carried by an array unit, and a processor which causes the detector system to detect emitted light at a detection angle based on the read code.

38. An apparatus for interrogating an addressable array of multiple features of different moieties, comprising: (a) a seat which can retain an array unit carrying the array, in a position for interrogation; (a) a detector system which can collect light at multiple different positions around a cone having an apex at a seated array, and (b) a processor which receives signals from the detector system and correlates the received signals with respective array features.

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L15: Entry 1 of 3

File: USPT

Aug 7, 1990

DOCUMENT-IDENTIFIER: US 4947036 A

**** See image for Certificate of Correction ****

TITLE: Self-monitoring optical sensor having a ratiometric output signal

Brief Summary Text (18):

The invention also includes self-monitoring means having activated and deactivated states responsive to a status signal output of the electronic signal processor. The photo-detector produces a third output voltage if either the first or second light is not generated. The detector third output voltage corresponds to the amount of stray light returned through the optical fiber to the detector. The processor divides the sum of the detector first and second output voltages by the detector third output voltage to produce a second ratio. Under normal operation of the invention, this second ratio will be much greater than 2. When one of the optical components of the apparatus is not functional, this second ratio will be approximately 2 or less, and such ratio is then utilized by the signal processor to output a status signal indicating a fault in one of the optical components.

Detailed Description Text (2):

At the outset, it should be clearly understood that like reference numerals are intended to identify the same structural elements, portions or surfaces consistently throughout the several drawing figures, as such elements, portions or surfaces may be further described or explained by the entire written specification, of which this detailed description is an integral part. Unless otherwise indicated, the drawings are intended to be read (e.g., cross-hatching, arrangement of parts, proportion, degree, etc.) together with the specification and are to be considered a portion of the entire written description of this invention. As used in the following description, the terms "horizontal", "vertical", "left", "right", "up" and "down", as well as derivatives thereof (e.g., "horizontally", "rightwardly", "upwardly", etc.) simply refer to the orientation of the illustrated structure as the particular drawing figure faces the reader. Similarly, the terms "inwardly" and "outwardly" generally refer to the orientation of a surface relative to its axis of elongation, or axis of rotation, as appropriate.

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L26: Entry 2 of 7

File: PGPB

Aug 14, 2003

DOCUMENT-IDENTIFIER: US 20030150987 A1

TITLE: FAIMS with non-destructive detection of selectively transmitted ions

Summary of Invention Paragraph:

[0009] Replacing the electrometric detector with a mass spectrometer detection system provides an opportunity to obtain additional experimental data relating to the identity of ions giving rise to the peaks in a CV spectrum. For instance, the mass-to-charge (m/z) ratio of ions that are selectively transmitted through the FAIMS at a particular combination of CV and DV can be measured. Additionally, replacing the mass spectrometer with a tandem mass spectrometer makes it possible to perform a full-fledged structural investigation of the selectively transmitted ions. Unfortunately, the selectively transmitted ions are difficult to extract from the analyzer region of the Carnahan device for subsequent detection by a mass spectrometer. In particular, the orifice plate of a mass spectrometer typically includes a single small sampling orifice for receiving ions for introduction into the mass spectrometer. This restriction is due to the fact that a mass spectrometer operates at a much lower pressure than the FAIMS analyzer. In general, the size of the sampling orifice into the mass spectrometer is limited by the efficiency of the mass spectrometer vacuum system. In principle, it is possible to align the sampling orifice of a mass spectrometer with a single opening in the FAIMS outer electrode of the Carnahan device; however, such a combination suffers from very low ion transmission efficiency and therefore poor detection limits. In particular, the Carnahan device does not allow the selectively transmitted ions to be concentrated for extraction through the single opening. Accordingly, only a small fraction of the selectively transmitted ions are extracted from the analyzer region, the vast majority of the selectively transmitted ions being neutralized eventually upon impact with an electrode surface.

Detail Description Paragraph:

[0079] In addition to the incident light being scattered by interactions with the ions confined within the FAIMS analyzer, light scattering also occurs if the ions heat a small volume of the surrounding bath gas. The photons of the incident light scatter as they pass into a hot gas because such a heated "bubble" of gas has a different refractive index than the cooler surrounding gas. One way of inducing the ions to heat a small volume of the surrounding bath gas is to adjust the asymmetric waveform that is applied to the inner electrode of a FAIMS device. Since the application of the asymmetric waveform results in the ions oscillating back and forth in approximately a same region of space, the gas that surrounds an ion becomes heated around the trajectory of the ion. This oscillation requires energy, and this energy is dissipated to create a region in the vicinity of the ion where the gas is hotter than the bulk of the gas in the FAIMS device. This region of heated gas is significantly larger in size than the ion, and is more likely to scatter the light than the relatively small ion itself. Of course, the oscillation of any ion present in the trapping region gives rise to heating of the bath gas. In other words, the ions that are detected may not be the ion of interest, despite the fact that they are transmitted at the same CV value. Accordingly, there may not be as much specificity as there would be in looking at the scattered light from the ion itself, as described above. Tandem FAIMS devices may be more appealing for studying gas phase ions based on the heating of the bath gas because of the extra specificity as opposed to a single FAIMS device. Alternatively, the non-destructive

nature of the detection method supports the combination of light scattering detection methods with mass spectrometry in order to achieve more specificity if desired.

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